

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Magnetic tunnel junction based microwave detector XIN FAN, RONG CAO, TAKAHIRO MORIYAMA¹, WEIGANG WANG², Department of Physics, University of Delaware, HUAIWU ZHANG, State Key Laboratory of Electronic Films and Integrated Devices, UESTC, JOHN XIAO, Department of Physics, University of Delaware — Besides being high sensitive magnetic field sensors, magnetic tunnel junction (MTJ) also has potential as a microwave magnetic field detector. The free magnetic layer in a MTJ precesses at a large angle under the excitation of microwave magnetic field at ferromagnetic resonance, while the pinned magnetic layer remains fixed due to the large damping. Consequently, the alternating relative angle between the free magnetic layer and the pinned magnetic layer induces a change of magnetoresistance in the MTJ. By detecting the average change of the magnetoresistance, one is able to determine both the magnitude and the frequency of microwave. We found that the sensitivity of such detector depends on both tunneling magnetoresistance at high bias and the damping of the free magnetic layer. This work was supported by NSF DMR Grant No. 08242249.

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Date submitted: 27 Nov 2009

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